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EXAMINER

RIDLEY, B

ART UNIT	PAPER NUMBER
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1764

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/332,415

Applicant(s)

LESIEUR, ROGER R.

Examiner

Basia Ridley

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☒ Claim(s) 1-19 and 21 is/are objected to.
- 8) ☐ Claims ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on ____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some * c) ☐ None of the CERTIFIED copies of the priority documents have been:
1. ☐ received.
2. ☐ received in Application No. (Series Code / Serial Number) ____.
3. ☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2,3.
- 18) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other:

DETAILED ACTION

Specification

✓ 1. The disclosure is objected to because of the following informalities:

- use of term "catalyzed cells" throughout the specification. It is not clear to the examiner what is meant by this term. Are cells of the catalyst bed being changed by a catalytic reaction (being catalyzed)? Is the catalyst used to catalyze cells of the catalyst bed in addition to catalyzing the reforming reaction of fuel gas?

Appropriate correction is required.

Drawings

✓ 2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, "a high temperature-compatible metal support" (of claim 13) and "said metal support connected to a source of electrical current" (of claim 14) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

3. The drawings are objected to under 37 CFR 1.83(a) because they fail to show the following details as described in the specification:

✓ Fig. 1 does not show "tendrils 4", as described in specification (P8/L10);

✓ Fig. 1 does not show "end 8", as described in specification (P8/L16-17), as there are multiple ref. 8 in Fig. 1 pointing to various areas of the catalyst bed;

✓ Fig. 1 does not show "end 10", as described in specification (P8/L16-17), as ref. 10 in Fig. 1 points in general direction of the catalyst bed

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- ✓ Fig. 2. does not show "inlet end 8", as described in specification (P9/L19), as ref. 8 in Fig. 2 points an area inside the catalyst bed, which does not appear to be different from the area of catalyst bed indicated by reference 2.

Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Correction is required. Applicant is reminded that no new matter shall be added.

- ✓ 4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description:

- Fig. 2, ref. "D"

Correction is required. Applicant is reminded that no new matter shall be added.

5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because:

- ✓ - Fig. 1, ref. "2" and "10" have both been used to designate the catalyst bed, as lead lines for both reference numbers point in the general direction of the catalyst bed;

- ✓ Fig. 2, ref. "6" and "8" have both been used to designate various areas of the catalyst bed; it is not clear what is the difference between designated areas.

Correction is required.

Claim Objections

6. Claims 1-19 and 21 are objected to because of the following informalities:

- ✓ - in claims 1 and 21, the term "an outlet process fuel gas passage" (line 8 of both claims) is objected to, suggested correction is --a process fuel gas outlet passage--;

- ✓ - in claim 2, the term "nobel metal" is objected to, suggested correction is --noble metal--;

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✓ in claim 13 the term “high temperature-**compatable** metal support” is objected to, suggested correction is --high temperature-**compatible** metal support--;

✓ in claim 21, the component “a) a monolithic open cell foam core catalyst bed (...)” is followed by component “d) a fuel gas reforming catalyst (...)”, suggested correction is --b) a fuel gas reforming catalyst (...)--;

Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-19 and 21-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

✓ Claims 1 and 21-23 recite the limitation: catalyst “is operable” (line 4 of all claims). Use of passive voice renders the claim indefinite, and does not allow one skilled in the art to ascertain that which may, or may be not, be readable thereon. How is the catalyst operating or what is operating it? As written claims 1 and 21-23 are unclear.

✓ Claims 1 and 21-23 recite the limitation “the fuel gas” (line 4 of all claims). There is insufficient antecedent basis for this limitation in the claim.

✓ The term “minimizing carbon deposition” in claims 1 and 21-23 (lines 5-6 of all claims) is a relative term which renders the claims indefinite. The term “minimizing” is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one

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of ordinary skill in the art would not be reasonably apprised of the scope of the invention. How low (or high) should the level of carbon deposition be to read on the claimed invention?

✓ Claims 1 and 21-23 recite the limitation "catalyzed cells" (line 5 of claims 1 and 21, and line 6 of claims 22-23). It is not clear to the examiner what is meant by this limitation. Are cells of the catalyst bed being changed by a catalytic reaction (being catalyzed)? Is the catalyst used to catalyze cells of the catalyst bed in addition to catalyzing the reforming reaction of fuel gas?

✓ Claims 1 and 21-23 recite the limitation "said foam core" (line 6 of all aforementioned claims). There is insufficient antecedent basis for this limitation in the claim.

✓ Regarding claims 1 and 22, it has been held that the functional "whereby" statement (lines 9 and 12 of both claims) does not define any structure and accordingly can not serve to distinguish. *In re Mason*, 114 USPQ 127, 44 CCPA 937 (1957).

✓ Claims 1 and 22 recite the limitation "will be transferred" (line 9 and 13 of both claims). Use of term "will be" renders the claim indefinite, and does not allow one skilled in the art to ascertain that which may, or may be not, be readable thereon. As written claims 1 and 22 are unclear.

man nt { Claims 1 and 22 recite the limitation "the processed gas stream" (lines 9-10 of both claims). There is insufficient antecedent basis for this limitation in the claim.

✓ Claim 2 recites the limitation "said catalyst" (line 1). There is insufficient antecedent basis for this limitation in the claim. It is not clear to the examiner which catalyst is this limitation referring to, as two catalysts are being recited in claim 1 (lines 4-5 and line 14) on which claim 2 is depended.

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✓ Claims 6 and 7 recite the limitation "copper/zinc catalyst" (line 3 of both claims). It is not clear to the examiner what is meant by this limitation. Does the catalyst comprise both, copper and zinc, or, does it comprise only one of the compounds, either copper or zinc?

✓ Claim 7 recites the limitation "an iron oxide/calcium oxide catalyst" (line 2). It is not clear to the examiner what is meant by this limitation. Does the catalyst comprise both, iron oxide and calcium oxide, or, does it comprise only one of the compounds, either iron oxide or calcium oxide?

✓ Claims 8 and 15 fail to further limit the claimed invention, as they do not recite any structural limitation of the assembly. The claims are indefinite as it is unclear to the examiner what structural elements and/or relationship is the applicant intending to encompass? Use of passive voice renders the claim unclear and does not allow one skilled in the art to ascertain that which may or may not be readable thereon.

✓ Claim 8 recites the limitation "wherein said first region (...) is further promoted with a noble metal catalyst" (lines 1-2). It is not clear to the examiner what is meant by this limitation. What is being promoted? (**the region or the catalyst** in the region); and, What is it being promoted with? (a noble metal **catalyst or a noble metal**).

main { Claim 9 recites the limitation "said noble metal catalyst" (line 1). There is insufficient antecedent basis for this limitation in the claim. It is not clear to the examiner which noble metal catalyst is this limitation referring to, as two noble metal catalysts are being recited prior to this limitation (in claims 4 and 8).

✓ Claim 9 states the limitation "selected from the group consisting of platinum, **palladium and rhodium, or mixtures thereof**". This claim is indefinite, as the alternative expressions are in

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a form of improper Markush group. Suggested correction: --selected from the group consisting of platinum, **palladium, rhodium, and mixtures thereof**--. See MPEP 2173.05(h).

✓ Claims 10-11 recite the limitation "said noble metal catalyst". There is insufficient antecedent basis for this limitation in the claims.

✓ The term "high temperature" in claim 13 is a relative term that renders the claim indefinite. The term "high" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. How high should the temperature be to read on the claimed invention?

✓ Claim 13 recites the limitation "high temperature-compatible metal support". It is not clear to the examiner what is meant by this limitation. What specific property should the metal support have to be compatible with high temperature?

✓ Claims 14-15 recite the limitation "said metal support". There is insufficient antecedent basis for this limitation in the claims.

✓ Claim 19 recites the limitation "said fuel gas". There is insufficient antecedent basis for this limitation in the claims.

✓ The term "quick start up" in claims 22-23 is a relative term which renders the claims indefinite. The term "quick" (line 5 of both claims) is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. How quick does the star up have to be to read on the claimed invention?

✓ Claims 22-23 recite the limitation "the reformer" (line 5 of both claims). There is insufficient antecedent basis for this limitation in the claims.

9. Claims 1-23 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are:

- claims 1 and 20-23, the structural relationship between the catalyst bed and catalyst. The terms "being provided" (line 3 of claims 1 and 21-23) and "deposited" (last line of claims 1 and 20-22) do not constitute positive structural language and they do not recite the structural features required for the said catalyst to be provided or deposited in said catalyst bed;
- claims 1 and 22, the structural relationship between the fuel gas inlet passage and outlet processed fuel gas passage. The term "being disposed in heat exchange relationship" (lines 7-8 of both claims) does not constitute positive structural language and it does not recite the structural features required for the said heat exchange to take place;
- claims 1 and 22, the structural relationship between the air inlet passage and processed gas stream. The term "being disposed in heat exchange relationship" (lines 11-12 of both claims) does not constitute positive structural language and it does not recite the structural features required for the said heat exchange to take place.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claim 20, as understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Clawson (WO 98/08771), in view of Narumiya et al. (USP 4,308,233).

Clawson discloses a similar autothermal reformer assembly (Fig. 3 and Specification), the assembly comprising:

- a) a catalyst bed (200) including an inlet end (210) and an outlet end (270);
- b) a fuel gas/steam mixture inlet passage (208, P20/L7-9);
- c) a fuel gas reforming catalyst (225) deposited in said catalyst bed (200).

While Clawson does disclose using a supported catalyst in the catalyst bed, the reference does not disclose the catalyst being supported on a cylindrical monolithic open cell foam core.

Narumiya et al. teaches a catalyst bed comprising:

- a cylindrical monolithic open cell foam core (Fig. 1, C4/L30-32).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a monolithic open cell foam core structure, as taught by Narumiya et al., as support for the catalyst in the assembly of Clawson, for the purpose of providing structure which allows the fuel gas to always be in contact with the surface of the catalyst to accelerate gas diffusion and to prevent the direct passage of unreacted gas.

12. Claims 1-6, 10-12 and 16-19, as understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Clawson (WO 98/08771), in view of Narumiya et al. (USP 4,308,233) and further in view of Setzer et al. (USP 4,415,484).

Regarding claims 1 and 16-17 Clawson in view of Narumiya et al. disclose all of the claim limitations as applied to claim 20 above (see paragraph 11 of this Office action).

Additionally, Clawson discloses the assembly comprising:

- a) a catalyst bed (200) including an inlet end (210) and an outlet end (270); wherein
 - an inlet portion of said catalyst bed is operable to combust a portion of the fuel gas (P24/L1-7);
- b) a fuel gas inlet passage (208); wherein
 - said fuel gas inlet passage (208) being disposed in heat exchange relationship with an outlet processed gas passage from said catalyst bed (P20/L9-11 & P21/L7-10);
- c) an air inlet passage (232); and
 - said air inlet passage (232) being disposed in heat exchange relationship with processed gas passage from said catalyst bed (P22/L13-15).

While Clawson does disclose combusting portion of the fuel gas in the inlet portion of the reactor, the reference does not disclose the catalyst bed being provided with a catalyst which is operable to combust a portion of the fuel gas.

- Setzer et al. teaches an inlet portion of a catalyst bed being provided with:
 - a catalyst which is operable to combust a portion of the fuel gas (C4/L42-52).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a catalyst which is operable to combust a portion of the fuel gas, as taught by Setzer et al., in the inlet portion of the catalyst bed of Clawson, for the purpose of allowing greater flexibility in the maximum allowable reactor temperature and the method of introducing the air into the reactor.

Regarding claims 2-5, Clawson, in view of Narumiya et al. and further in view of Setzer et al. disclose all the claim limitations as set forth above. Additionally Setzer et al. teaches an autothermal reformer assembly, wherein:

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- said catalyst includes a noble metal and calcium oxide (C2/L5-6);
- said foam core catalyst bed comprises at least two catalyzed regions (C4/L59-63); wherein
- each region has a different catalyst composition (C4/L59-63);
- a first region of said foam core catalyst bed contains a noble metal catalyst in combination with calcium oxide (C3/L21-22 & C4/L53-55);
- a second region of said foam core catalyst bed contains a base metal catalyst in combination with calcium oxide (C3/L20-21 & C4/L45-46).

Regarding claim 6, Clawson, in view of Narumiya et al. and further in view of Setzer et al. disclose all the claim limitations as set forth above, but the references do not explicitly disclose said first region containing platinum catalyst and said second region containing a copper or copper/zinc catalyst. As both copper or copper/zinc catalyst and platinum catalysts were well known in the art at the time the invention was made (as evidenced by Jenkins (USP 4,789,540)), the catalyst selection being driven by system requirements, such as desired catalyst activity, desired finished product composition and by catalyst cost. As the specification is silent to unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a platinum catalyst in said first region and a copper or copper/zinc catalyst in said second region of the catalyst bed, as disclosed by Clawson, in view of Narumiya et al. further in view of Setzer et al., for the purpose of obtaining desired catalyst activity and desired finished product composition.

Regarding claims 10-11, Clawson, in view of Narumiya et al. and further in view of Setzer et al. disclose all the claim limitations as set forth above. Additionally Setzer et al. teaches an autothermal reformer assembly, wherein:

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- said foam core catalyst bed includes a first region which contains a noble metal and calcium oxide (C4/L53-55);
- said noble metal catalyst is selected from the group consisting of platinum, palladium and rhodium (C4/L53-55).

While Clawson, in view of Narumiya et al. and further in view of Setzer et al. do not explicitly disclose said second region containing noble metal catalyst and not containing calcium oxide, noble metal catalyst not containing calcium oxide were well known in the art at the time the invention was made (as evidenced by Clawson (P19/L27-P20/L7)), the catalyst selection being driven by system requirements, such as desired catalyst activity, and by catalyst cost. As the specification is silent to unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a noble metal catalyst not containing calcium oxide, as disclosed by Clawson, in view of Narumiya et al. and further in view of Setzer et al., for the purpose of obtaining desired catalyst activity.

Regarding claim 12, Clawson, in view of Narumiya et al. and further in view of Setzer et al. disclose all the claim limitations as set forth above. Additionally Narumiya et al. teaches an assembly, wherein:

- said foam core catalyst bed includes at least one ceramic foam support body (C2/L45-49).

Regarding claims 18-19, Clawson, in view of Narumiya et al. and further in view of Setzer et al. disclose all the claim limitations as set forth above. Additionally Clawson discloses an autothermal reformer assembly, wherein:

- said air inlet passage contains air (P23/L19-22)
- said fuel gas is methanol (P20/L23-24).

While Clawson, in view of Narumiya et al. and further in view of Setzer et al. do not explicitly disclose said air inlet passage containing an air/steam mixture, the usage of steam as a temperature modifier and to avoid soot formation in partial oxidation of hydrocarbons was well known in the art at the time the invention was made (as evidenced by Bhattacharyya et al. (USP 5,498,370)). As the specification is silent to unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to add steam to the said air inlet passage, as disclosed by Clawson, in view of Narumiya et al. and further in view of Setzer et al., for the purpose of using the steam as a temperature modifier and to avoid soot formation.

13. Claims 13-15, as understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Clawson (WO 98/08771), in view of Narumiya et al. (USP 4,308,233), further in view of Setzer et al. (USP 4,415,484), as applied to claims 1-6, 10-12 and 16-19 above, and further in view of Sheller. (USP 5,384,099).

Clawson, in view of Narumiya et al. and further in view of Setzer et al. disclose all the claim limitations as set forth above, but they do the references not disclose the catalyst bed comprising a high temperature-compatible metal support connected to a source of electrical current so as to serve as a resistance heating element by being heated to operating temperature within about twenty seconds of applying electrical current thereto.

Sheller teaches a monolithic catalyst bed, wherein:

- said catalyst bed includes a high temperature-compatible metal support selected from the group consisting of stainless steel, nickel alloys and iron-aluminum alloys (C1/L26-29);
- said metal support is connected to a source of electrical current, so as to serve as a resistance heating element (C1/L52-63);

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- said metal support is electrically heated to operating temperature within about twenty seconds of applying electrical current thereto (C1/L65-66).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a high temperature-compatible metal support connected to a source of electrical current, as taught by Sheller, in the catalyst bed of Clawson, in view of Narumiya et al. and further in view of Setzer et al., for the purpose of activating the catalyst during the start up of the reformer.

14. Claims 1-4, 7-9 and 22, as understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Clawson (WO 98/08771), in view of Narumiya et al. (USP 4,308,233) and further in view of Setzer et al. (USP 4,451,578).

Regarding claim 1 Clawson in view of Narumiya et al. disclose all of the claim limitations as applied to claim 20 above (see paragraph 11 of this Office action).

Additionally, Clawson discloses the assembly comprising:

- a) a catalyst bed (200) including an inlet end (210) and an outlet end (270); wherein
 - an inlet portion of said catalyst bed is operable to combust a portion of the fuel gas (P24/L1-7);
- b) a fuel gas inlet passage (208); wherein
 - said fuel gas inlet passage (208) being disposed in heat exchange relationship with an outlet processed gas passage from said catalyst bed (P20/L9-11 & P21/L7-10);
- c) an air inlet passage (232); and
 - said air inlet passage (232) being disposed in heat exchange relationship with processed gas passage from said catalyst bed (P22/13-15).

While Clawson does disclose combusting portion of the fuel gas in the inlet portion of the reactor, the reference does not disclose the catalyst bed being provided with a catalyst which is operable to combust a portion of the fuel gas.

Setzer et al. teaches an inlet portion of a catalyst bed being provided with:

- a catalyst which is operable to combust a portion of the fuel gas (C5/L53-59).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a catalyst which is operable to combust a portion of the fuel gas, as taught by Setzer et al., in the inlet portion of the catalyst bed of Clawson, for the purpose of allowing greater flexibility in the maximum allowable reactor temperature and the method of introducing the air into the reactor.

Regarding claim 3, Clawson, in view of Narumiya et al. and further in view of Setzer et al. disclose all the claim limitations as set forth above. Additionally Setzer et al. teaches an autothermal reformer assembly, wherein:

- said foam core catalyst bed comprises at least two catalyzed regions (C5/L53-C6/L15);
wherein
- each region has a different catalyst composition (C5/L53-C6/L15).

Regarding claims 2, 4 and 7-9, Clawson, in view of Narumiya et al. and further in view of Setzer et al. disclose the claim limitations as set forth above. Additionally Setzer et al. teaches an autothermal reformer assembly, wherein:

- said first region contains an iron oxide/calcium oxide catalyst (C5/L53-61);
- said first region is further promoted (C2/L29-30).

While the references do not explicitly disclose said second region containing a copper or copper/zinc catalyst. As copper or copper/zinc catalyst were well known in the art at the time the invention was made (as evidenced by Jenkins (USP 4,789,540)), the catalyst selection being driven by system requirements, such as desired catalyst activity, desired finished product composition and by catalyst cost. As the specification is silent to unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a platinum catalyst in said first region and a copper or copper/zinc catalyst in said second region of the catalyst bed, as disclosed by Clawson, in view of Narumiya et al. further in view of Setzer et al., for the purpose of obtaining desired catalyst activity and desired finished product composition.

While Setzer et al. does disclose the first region being further promoted, the reference does not explicitly disclose the region being further promoted with a noble metal catalyst being selected from the group consisting of platinum, palladium and rhodium, or mixtures thereof.

As promoters containing noble metal, specifically platinum, were well known in the art at the time the invention was made (as evidenced by Peters (USP 5,110,780)), and as the specification is silent to unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a platinum promoter in said first region of the catalyst bed as disclosed by Clawson, in view of Narumiya et al. and further in view of Setzer et al., for the purpose of increasing of catalyst activity and lowering the carbon monoxide production in the reactor.

Regarding claim 22, Clawson, in view of Narumiya et al. and further in view of Setzer et al. disclose the claimed invention as set forth above. Additionally Setzer et al. teaches an autothermal reformer assembly, wherein:

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- said catalyst bed being provided with promoted catalyst (C2/L29-30).

While Setzer et al. does disclose the catalyst bed being provided with promoted catalyst, the reference does not explicitly disclose the bed being promoted with a noble metal catalyst which is operable to combust a portion of the fuel gas at a temperature of about 200°F.

As promoters containing noble metal, were well known in the art at the time the invention was made (as evidenced by Peters (USP 5,110,780)), and as the specification is silent to unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a noble metal-promoted catalyst which is operable to combust a portion of the fuel gas at a temperature of about 200°F in said catalyst bed, as disclosed by Clawson, in view of Narumiya et al. and further in view of Setzer et al., for the purpose of increasing catalyst activity and lowering the carbon monoxide production in the reactor.

15. Claims 21 and 23, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Setzer et al. (USP 4,451,578), in view of Narumiya et al. (USP 4,308,233).

Regarding claim 21, Setzer et al. discloses a similar autothermal reformer assembly comprising:

a) a catalyst bed (C5/L41);

- an inlet portion of said catalyst bed being provided with a catalyst which is operable to combust a portion of the fuel gas (C5/L54-59);

d) a fuel gas reforming catalyst deposited in said foam core catalyst bed (C5/L59-C6/L4).

While Setzer et al. does not explicitly disclose the catalyst bed having an inlet end and an outlet end, these elements are inherent in the disclosed assembly.

While Setzer et al. does disclose using a supported catalyst in the catalyst bed, the reference does not disclose the catalyst being supported on a monolithic open cell foam core.

Narumiya et al. teaches a catalyst bed comprising:

- a monolithic open cell foam core (C4/L30-32);

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a monolithic open cell foam core structure, as taught by Narumiya et al., as support for the catalyst in the assembly of Setzer et al., for the purpose of providing structure which allows the fuel gas to always be in contact with the surface of the catalyst to accelerate gas diffusion and to prevent the direct passage of unreacted gas.

Regarding claim 23, Setzer et al., in view of Narumiya et al. disclose the claimed invention as applied to claim 21 above. Additionally Setzer et al. teaches an autothermal reformer assembly, wherein:

- said catalyst bed is being provided with promoted catalyst (C2/L29-30).

While Setzer et al. does disclose the catalyst bed being provided with promoted catalyst, the reference does not explicitly disclose the bed being promoted with a noble metal catalyst which is operable to combust a portion of the fuel gas at a temperature of about 200°F.

As promoters containing noble metal, were well known in the art at the time the invention was made (as evidenced by Peters (USP 5,110,780)), and as the specification is silent to unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a noble metal-promoted catalyst which is operable to combust a portion of the fuel gas at a temperature of about 200°F in said catalyst bed, as disclosed by Setzer

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et al., in view of Narumiya et al. for the purpose of increasing catalyst activity and lowering the carbon monoxide production in the reactor.

Double Patenting

16. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

17. Claims 1-5, 8-18 and 20-23 are provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 1-5 and 8-22 of copending Application No. 09/321,390. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

18. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

19. Claims 6-7 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 6-7 of copending Application No. 09/321,390 in view of Jenkins (USP 4,789,540).

While the copending application do not explicitly disclose said second region containing a copper or copper/zinc catalyst, the copper or copper/zinc catalyst were well known in the art at the time the invention was made (as evidenced by Jenkins (USP 4,789,540)), with the catalyst selection being driven by system requirements, such as desired catalyst activity, desired finished product composition and by catalyst cost. As the specification is silent to unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a platinum catalyst in said first region and a copper or copper/zinc catalyst in said second region of the catalyst bed, as disclosed by 09/321,390, for the purpose of obtaining desired catalyst activity and desired finished product composition.

This is a provisional obviousness-type double patenting rejection.

20. Claim 19 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 09/321,390 in view of Clawson (WO 98/08771).

While the copending application do not explicitly disclose said fuel gas being methanol, using methanol as a fuel was well known in the art at the time the invention was made (as evidenced by Clawson (WO 98/08771), the fuel selection being driven by system requirements, such desired finished product composition and by fuel availability and cost. As the specification is silent to unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use methanol as fuel gas in a process disclosed by 09/321,390, for the purpose of obtaining desired product at optimal process cost.

This is a provisional obviousness-type double patenting rejection.

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Conclusion

21. In view of the foregoing, none of the claims are allowed.
22. The Group and/or Art Unit location of your application in the PTO has changed. To aid in correlating any papers for this application, all further correspondence regarding this application should be directed to Group Art Unit 1764.
23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Basia Ridley, whose telephone number is (703) 305-5418. The examiner can normally be reached on Monday through Thursday, from 6:45 AM to 5:15 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marian Knode, can be reached on (703) 308-4311.

The fax phone number for Group 1700 is (703) 305-3599 (for Official papers after Final), (703) 305-5408 (for other Official papers) and (703) 305-6078 (for Unofficial papers). When filing a fax in Group 1700, please indicate in the Header (upper right) "Official" for papers that are to be entered into the file, and "Unofficial" for draft documents and other communication with the PTO that are not for entry into the file of the application. This will expedite processing of your papers.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0661.

Basia Ridley
Examiner
Art Unit 1764



BR
August 24, 2000


**HIEN TRAN
PRIMARY EXAMINER**